



# BIPM Capacity Building & Knowledge Transfer Programme

Andy Henson

Chingis Kuanbayev

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# BIPM Capacity Building & Knowledge Transfer Programme (CB&KT)

## Background

At the 25<sup>th</sup> CGPM, A proposal for a **BIPM Visitor Programme** was tabled, but not funded.

Conceptually the approach was strongly supported and led to an amendment of the draft Resolution.

## After the 25<sup>th</sup> CGPM

- ♦ The ideas were further refined based on the discussions around the CGPM, presented to and supported by the CIPM in March 2015.
- ♦ The new voluntary sponsor based programme was given a new name but broadly similar objectives...



## CB&KT Programme goals

- ♦ *To reinforce the international metrology system and to “balance the load” amongst the NMIs.*
- ♦ *To promote efficient operation of the system.*
- ♦ *To aid NMIs from Countries and Economies with Emerging Metrology Systems (CEEMS) to engage appropriately and effectively with the international measurement system.*

# Background: Capacity Building and Knowledge transfer (CB&KT)

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At the 25<sup>th</sup> CGPM, A proposal for a **BIPM Visitor Programme** was tabled, but not funded. Conceptually the approach was strongly supported and led to an amendment of the draft Resolution:

*“Member States, as well as international organizations, private organizations and foundations to maintain the provision of additional voluntary support of all kinds to support specific BIPM mission-related activities, particularly those that facilitate participation in the activities of the BIPM by those countries without well-developed metrology infrastructure.”*

## After the 25<sup>th</sup> CGPM

- ◆ The ideas were further refined based on the discussions around the CGPM, presented to and supported by the CIPM in March 2015.
- ◆ The new voluntary programme was given a new name but broadly similar objectives...

# The CB&KT aims and objectives

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***The aim of the BIPM CB&KT programme is to increase the effectiveness with which Member States and Associates engage in the world-wide coordinated metrological system.***

## ***Objectives***

- ♦ *To reinforce the international metrology system and to “balance the load” amongst the NMIs.*
- ♦ *To promote efficient operation of the system.*
- ♦ *To aid NMIs from Countries and Economies with Emerging Metrology Systems (CEEMS) to engage appropriately and effectively with the international measurement system.*

# Participation in the activities of the BIPM

Currently 58 Member States and 41 Associates of the General Conference



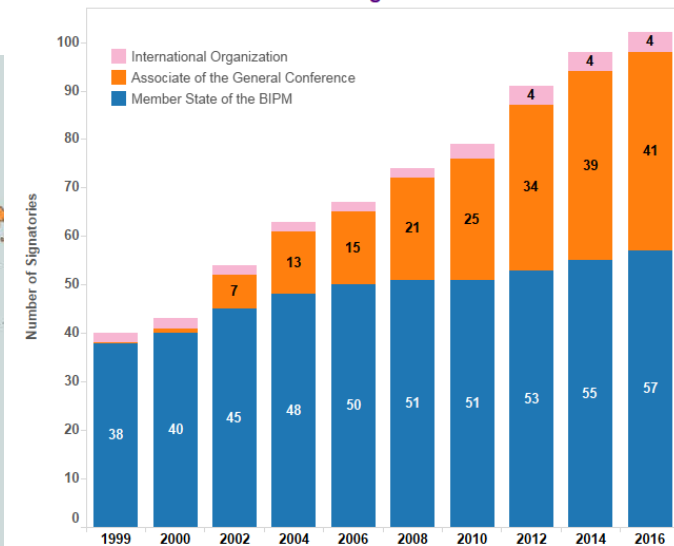
**In the 16 years leading up to the millennium**

- 3 new Member States

**In the 16 years since the new millennium**

- 10 new MS, plus 41 Associate States and Economies

**CIPM MRA Signatories**



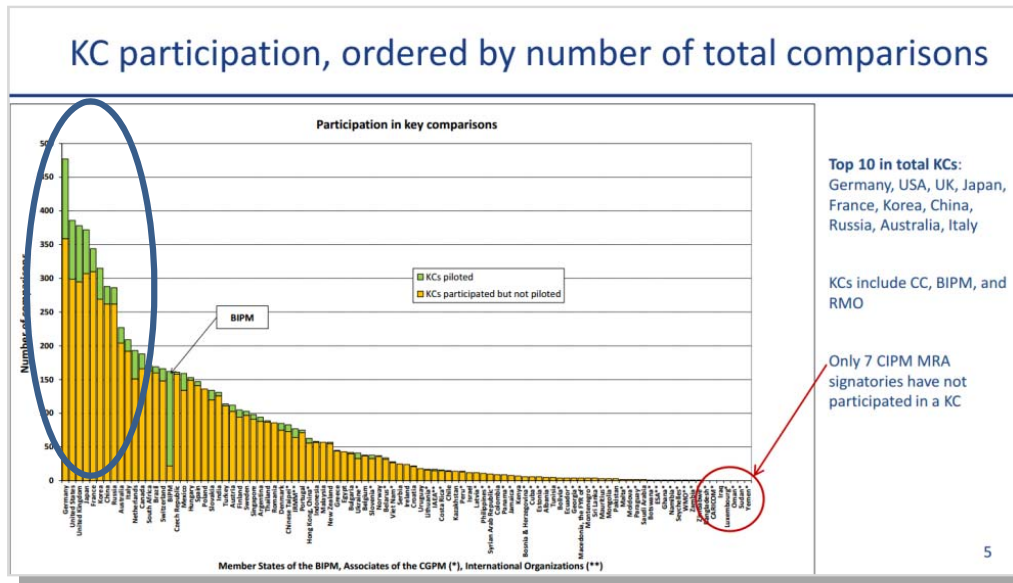
*Includes countries and economies with emerging metrology systems (CEEMS)*

*At the very least Associates want to be able to participate in the CIPM MRA (the reason for Associate status)*

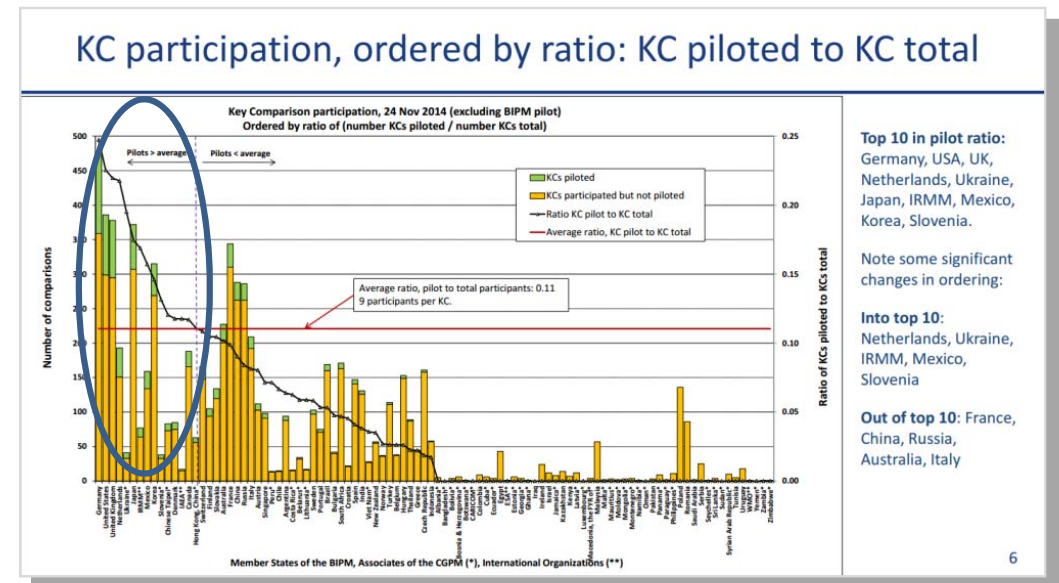
# CIPM MRA: Lifetime

Data from the **CIPM MRA Review Workshop**  
Held on 13 – 14 October 2015 at the BIPM, Sevres

*Analysis of participation in comparisons*



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# A 'Menu' of activities



Focused capacity building opportunities (typically) at the BIPM



Engagement with the Global QI capacity building community



Scientific comparisons of particular interest to Member States that are developing countries

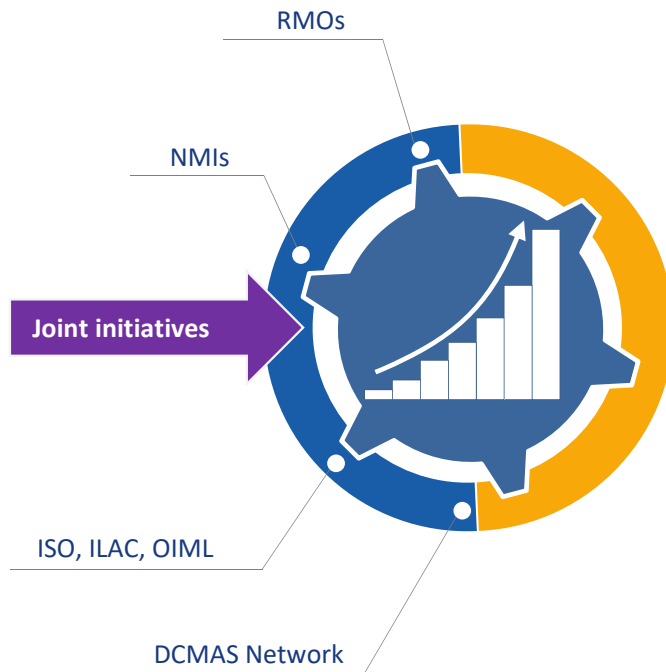
# Focused capacity building



- Visits/training for staff from **new/inexperienced Member States and Associates** to aid their engagement in the international system
- Visits/training for **new/inexperienced chairs and potential chairs of RMO Technical Committees (TCs)/Working Groups (WGs)** with the aim of improving the efficiency and effectiveness of the CIPM MRA
- Visits/training for staff from NMIs with the aim of encouraging them to become **future pilot laboratories** for comparisons
- Visits/training for staff from **NMIs that are in the process of developing Calibration and Measurement Capabilities (CMCs)** for the first time
- Visits by **RMO secretariat staff**



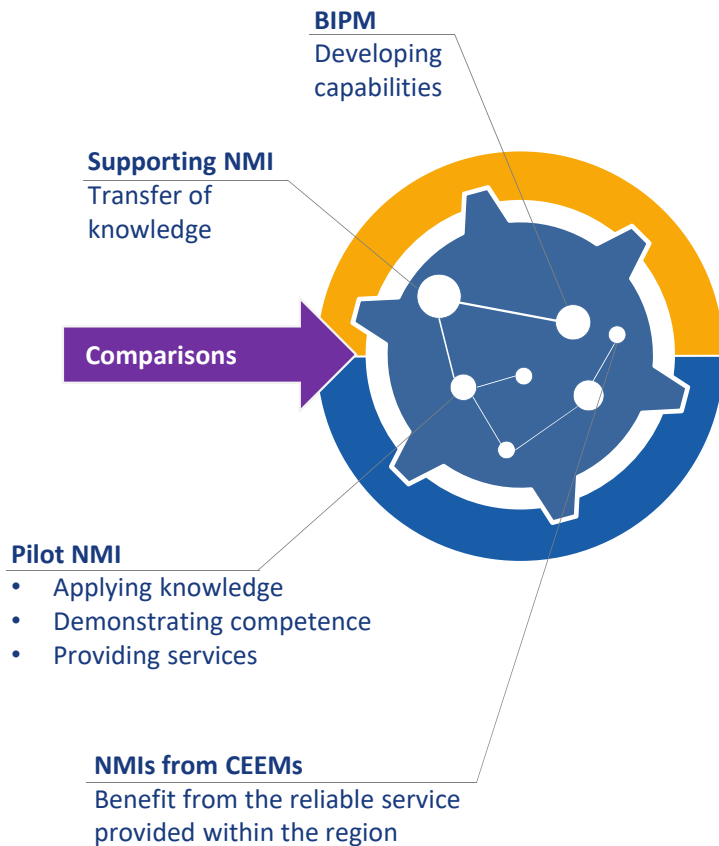
# Engagement with the Global QI



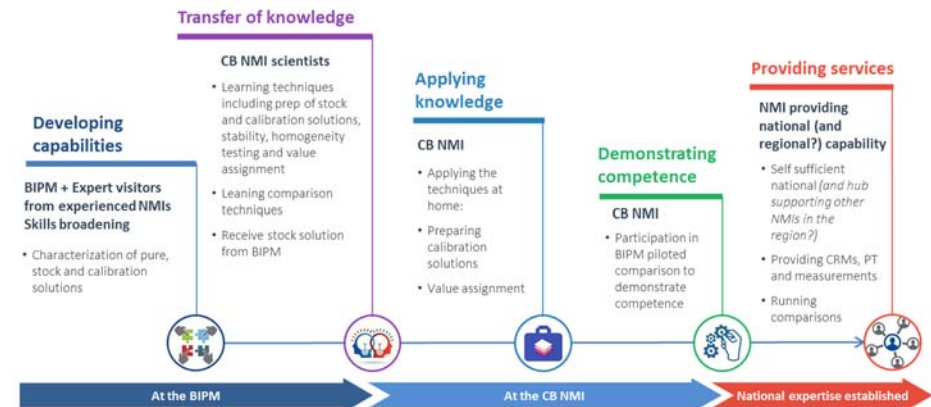
- Enhanced BIPM engagement in the DCMAS Network (network of International Organizations that liaise regarding their capacity building activities)
- Enhanced engagement with potential Member States and Associates
- Promoting 'awareness raising' and providing information for decision makers
- Specific engagement with states immediately after they first become involved with the BIPM as Member States or Associates
- Metrology school activities and placements



# Scientific comparisons



- Additional BIPM relevant scientific/technical project(s) of interest to developing countries
- Knowledge transfer to scientists developing capabilities in the interested area, including periods as visiting scientists at the BIPM



# CB&KT Initiatives

## COMPLETED



- 2016 BIPM-IPS joint Varenna Metrology School and METAS project
- 2016 "Leaders of Tomorrow" course
- 2016 "BIPM-GULFMET TC Workshop"
- 2017 BIPM-EURAMET TC leadership course

*Around 90 participants from 35 countries participated in various training courses!*

**A number of other ideas under development.**

**We are open for suggestions!**

**Welcome new Sponsors!**

## ONGOING



- 2016 - 2018 "Metrology for Safe Food and Feed in Developing Economies" project
- 2016 - 2019 Metrology for clean air: capabilities in gas metrology
- 2017–2018 "Support for GULFMET key comparison of Zener voltage standards" project

## FUTURE



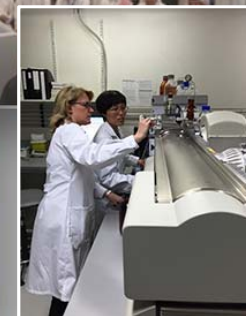
- 2017 Sound beginning in the CIPM MRA course
- 2017 APMP-DEC "Leadership training" course
- 2017 EURAMET - BIPM Training on review of quality management systems
- 2018 BIPM- TÜBİTAK UME project placements
- 2018 Effective participation in Universal Coordinated Time (UTC)
- 2018 BIPM – COOMET CEEMS Workshop
- 2019 BIPM – COOMET TC Workshop

**Under development 11**

# Feedback from participants

*The course objectives were met!*

*The course will be useful in my work!*



## **Dennis Mkhize, South Africa**

*"I gained numerous skills upon completion of my training, such as linking metrological traceability to the quantitative analysis of..."*

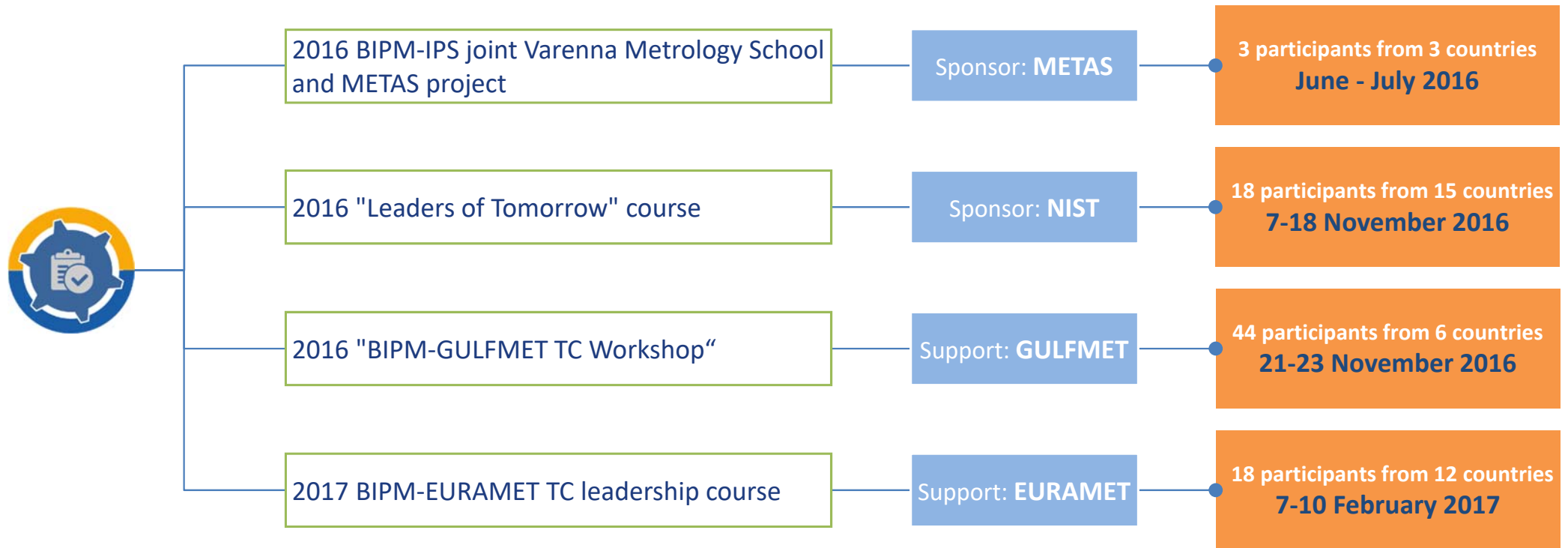
## **Valnei Smarcaro da Cunha, Brazil**

*"...course was a highly positive experience that went beyond the technical aspects, as I could interact with colleagues from different areas, from different countries and cultures. A very pleasant and fruitful experience."*

## **Katharina Zellhofer, Austria**

*"I got a much better understanding [of the work as TC-Chair] and therefore will be able to support my colleagues and may implement relevant information where needed. I am very grateful for this participation."*

# COMPLETED INITIATIVES





## COMPLETED INITIATIVES: 2016 Varenna Metrology School and METAS project

### METAS sponsored training

**Complete**

Summer 2016

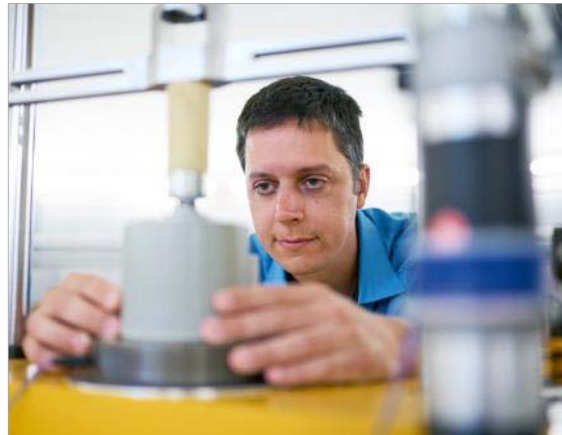
**3 placements:** *Albania, Argentina and South Africa*

*“The three METAS placements were indeed a success. It was an enriching experience for both, the three scientists and for the METAS laboratories involved.”*

Dr Rudolf Thalmann, METAS program coordinator



**Yljon Seferi (General Directorate of Metrology, Albania)** – performed calibration and type testing to the power quality functions of smart meters.



**Alejandro Savarin (INTI)** – studied the influence quantities when using multiple force transducers working in parallel.



**Dennis Mkhize (NMISA)** – carried out physical and chemical analyses of a wide variety of alcohols from different matrices.

# COMPLETED INITIATIVES: 2016 "Leaders of Tomorrow" course

## NIST sponsored 11 day course

**Complete**

**18 participants from all RMOs**

The "Leaders of Tomorrow" course was aimed at new and potential RMO Technical Committee Chairs and Working Group Convenors.

### **Course dates:**

7 – 18 November, 2016

### **Location:**

BIPM, Sevres

| 2016 "Leaders of Tomorrow" course |                    |              |
|-----------------------------------|--------------------|--------------|
| RMOs                              | Countries          | Participants |
| AFRIMETS - 6                      | South Africa       | 3            |
|                                   | Kenya              | 2            |
|                                   | Egypt              | 1            |
| APMP - 1                          | Thailand           | 1            |
| COOMET - 2                        | Belarus            | 1            |
|                                   | Ukraine            | 1            |
| EURAMET - 1                       | Bosnia/Herzegovina | 1            |
| GULFMET - 1                       | Saudi Arabia       | 1            |
| SIM - 7                           | Argentina          | 1            |
|                                   | Panama             | 1            |
|                                   | Canada             | 1            |
|                                   | Costa Rica         | 1            |
|                                   | Mexico             | 1            |
|                                   | Brazil             | 1            |
|                                   | USA                | 1            |
| Total 15 countries                |                    | 18           |



*Group work on CMC review*

## COMPLETED INITIATIVES: 2016 GULFMET-sponsored training Workshop

### GULFMET funded 3 day Workshop

**Complete**

**44 participants from GULFMET**

The workshop was designed to provide GULFMET Technical Committee members with the skills, knowledge and tools to help them participate in the mechanisms of the CIPM MRA.

#### **Course dates:**

21-23 November 2016

**Location:** Dubai, (United Arab Emirates)

#### 2016 "BIPM-GULFMET TC Workshop"

| Countries                | Participants |
|--------------------------|--------------|
| Bahrain                  | 3            |
| Oman                     | 2            |
| Qatar                    | 3            |
| Saudi Arabia             | 9            |
| State of Kuwait          | 3            |
| UAE                      | 24           |
| <b>Total 6 countries</b> | <b>44</b>    |



*GULFMET technical committee members*

*This workshop provided the attendees first-hand training from Mr Andy Henson of the BIPM on both requirements and practical knowledge for running successful measurement comparisons, and submitting and reviewing CMCs, as well as Quality Systems.*



## COMPLETED INITIATIVES: 2017 BIPM-EURAMET TC leadership course

### EURAMET funded 4 day training

**Complete**

**18 participants from EURAMET**

The BIPM–EURAMET "TC Leadership" course was focused on the scientific and technical staff members of EURAMET's NMIs and DIs who are active in the EURAMET Technical Committees and have shown potential for TC leadership.

**Course dates:**

7 – 10 February, 2017

**Location:** BIPM

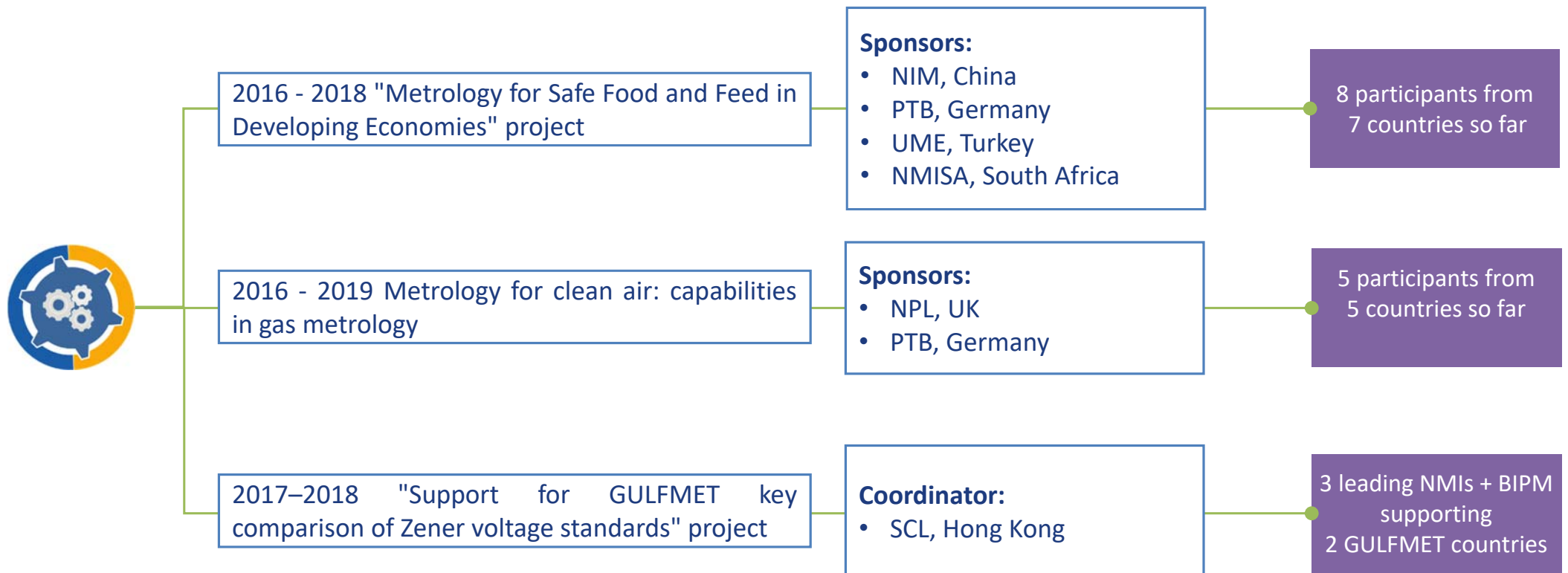
[www.bipm.org](http://www.bipm.org)

| 2017 BIPM-EURAMET "TC Leadership" course |                       |              |
|------------------------------------------|-----------------------|--------------|
| RMOs                                     | Countries             | Participants |
| EURAMET                                  | Austria (1 NMI, 1 DI) | 2            |
|                                          | Bosnia & Herzegovina  | 2            |
|                                          | Spain (2 NMI, 1 DI)   | 3            |
|                                          | Turkey                | 1            |
|                                          | Belgium               | 1            |
|                                          | Germany               | 2            |
|                                          | Czech Republic        | 1            |
|                                          | Sweden (1 NMI, 1 DI)  | 2            |
|                                          | Romania               | 1            |
|                                          | Poland                | 1            |
|                                          | Slovakia              | 1            |
|                                          | Switzerland           | 1            |
| Total 12 countries                       |                       | 18           |

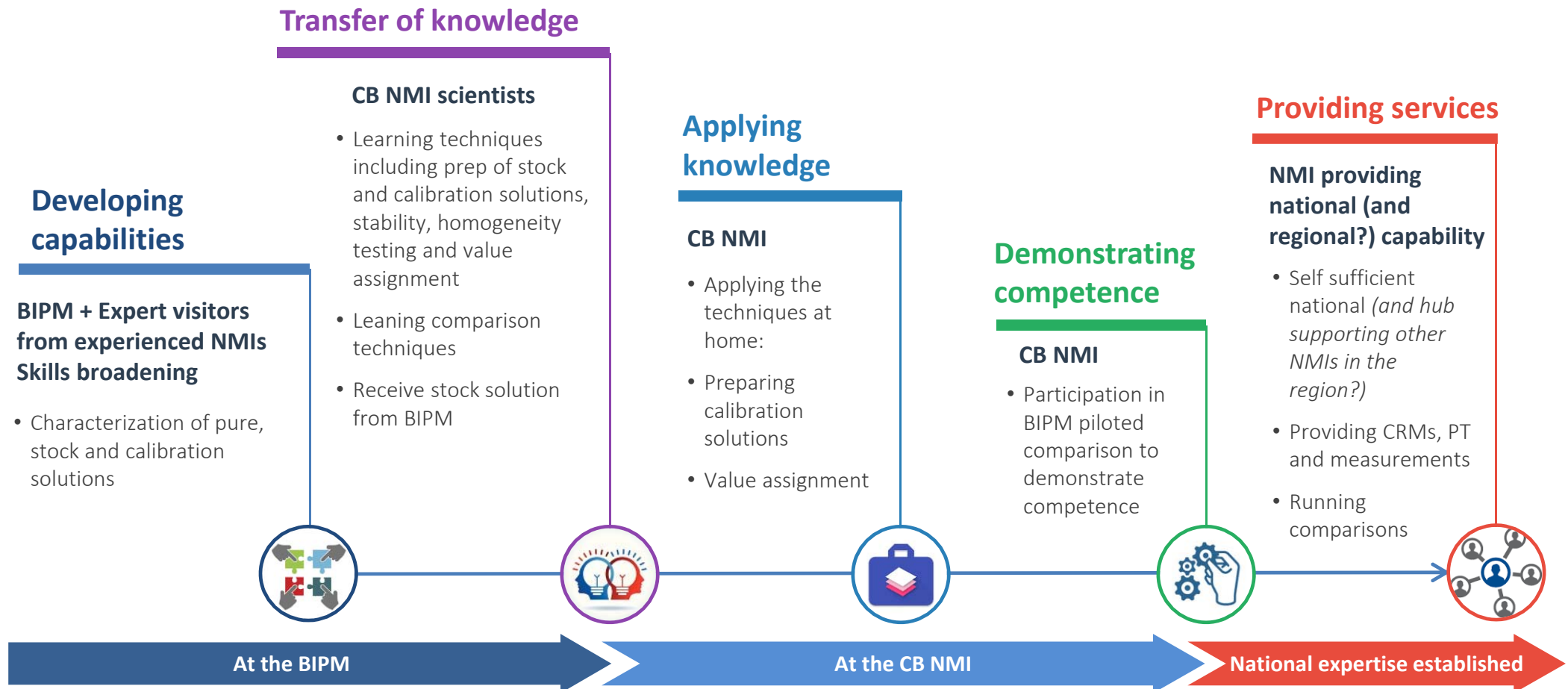


*'Hands-on' discussions*

# ONGOING INITIATIVES



# Laboratory-based CB&KT



# ONGOING INITIATIVES: "Metrology for Safe Food and Feed in Developing Economies" project

## The project

- ✓ Allows NMIs to work together to strengthen mycotoxin metrology infrastructure
- ✓ Provides knowledge transfer to scientists developing capabilities in this area, including periods as visiting scientists at the BIPM
- ✓ Enables NMIs to provide mycotoxin calibrant and matrix reference materials to support mycotoxin testing laboratories within their countries.

**Dates and venue:**  
Started in 2016, BIPM

### Sponsors:

- NIM, China
- PTB, Germany
- TÜBİTAK UME, Turkey
- NMISA, South Africa

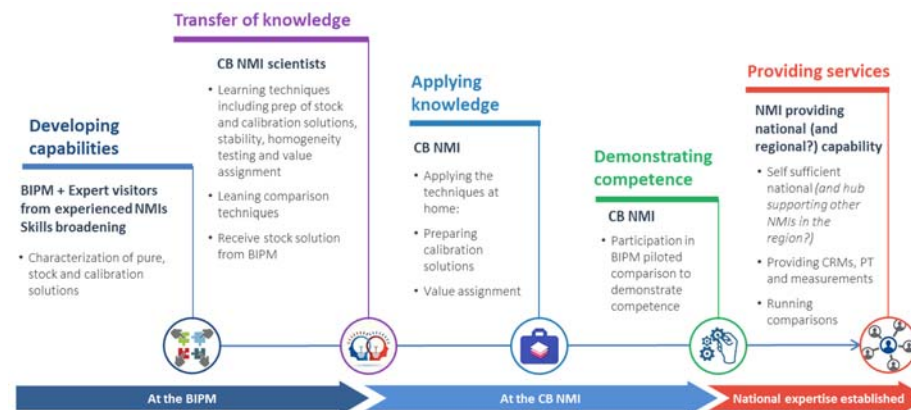
### 8 participants from 7 NMIs so far

- NIM, China (self-funded)
- INTI, Argentina
- INMETRO, Brazil
- KEBS, Kenya
- NIMT, Thailand
- TÜBİTAK UME, Turkey (self-funded)
- NMISA, South Africa (self-funded)

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Open for  
sponsors



# ONGOING INITIATIVES: “Metrology for clean air” - Gas Metrology & FTIR

Open for  
sponsors

## The project

- ✓ Allows NMIs to strengthen their gas standard capabilities and further develop their national metrology infrastructure in support of their air quality and emissions measurement communities
- ✓ Provides knowledge transfer to scientists developing capabilities in this area, including periods as visiting scientists at the BIPM
- ✓ Permits the BIPM to provide knowledge transfer on the establishment and operation of FTIR capabilities for the value assignment and comparison of gas standards for air quality and emissions monitoring
- ✓ Visiting scientists have the opportunity to undertake a six-month knowledge transfer secondment in the BIPM's Chemistry Department



### Sponsors:

- NPL, UK
- PTB, Germany

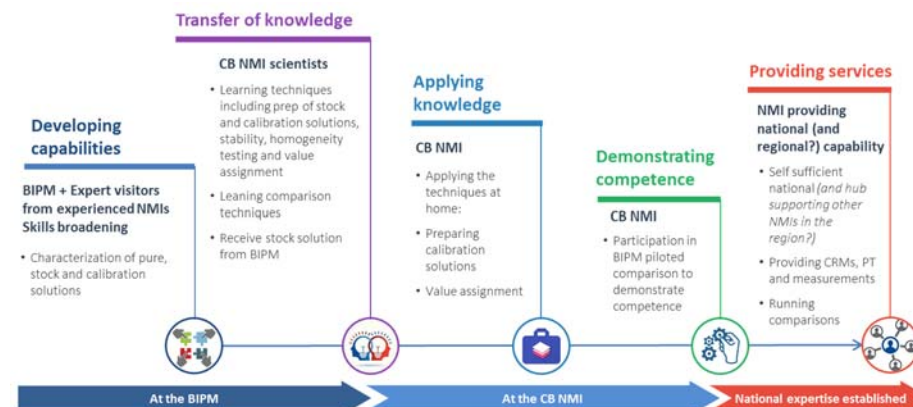
### Dates and venue:

Started in 2016, BIPM

### 5 participants from 5 countries so far

- CENAM, Mexico
- NPL, UK (self-funded)
- NPLI, India
- NMISA, South Africa
- LNE, France (self-funded)

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# ONGOING INITIATIVES: Support for regional key comparison of Zener voltage standards

## *The project*

- ✓ To provide support for the organization of one of GULFMET's first key comparisons - **GULFMET.EM.BIPM-K11** - a comparison of Zener voltage standards.
- ✓ The project was established in response to a discussion at the 35<sup>th</sup> meeting of the JCRB (March 2016) on cross-membership of Regional Metrology Organizations (RMOs) in the context of providing assistance to GULFMET, the newest RMO.

### Comparison dates:

June 2017 to March 2018

### Coordinator:

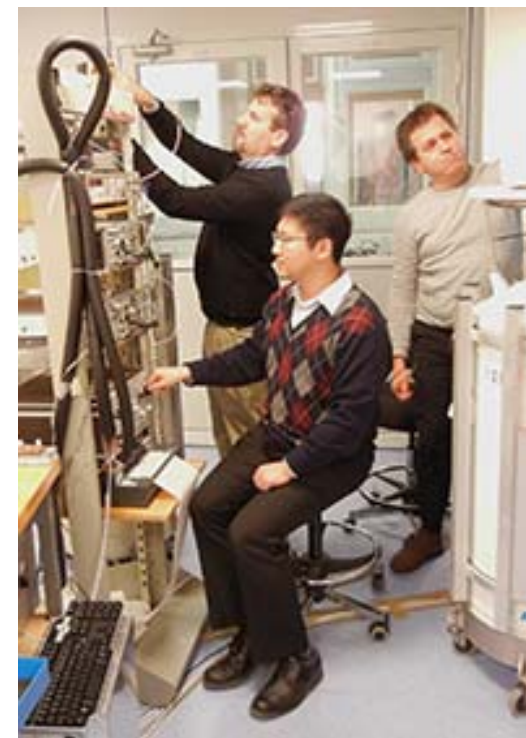
SCL, Hong Kong

### Participants:

- KRISS, Republic of Korea
- IMBIH, Bosnia and Herzegovina
- BIPM

### Participants from GULFMET

- EMI, United Arab Emirates
- SASO-NMCC, Saudi Arabia



*The comparison coordinator, Dr Steven Yang from SCL, was seconded to the BIPM voltage laboratory from 9 January to 13 March 2017*

## FUTURE INITIATIVES: 2017 “Sound beginning in the CIPM MRA” course



11 day course

**24 participants from 19 countries**

Training aimed at relevant staff from NMIs that have signed the CIPM MRA but not yet submitted CMCs (or are early in the process)

Will help both, to optimize the NMI success rates and minimize the burden on the wider community that will conduct the reviews.

**Course dates:**

13 to 24 November 2017

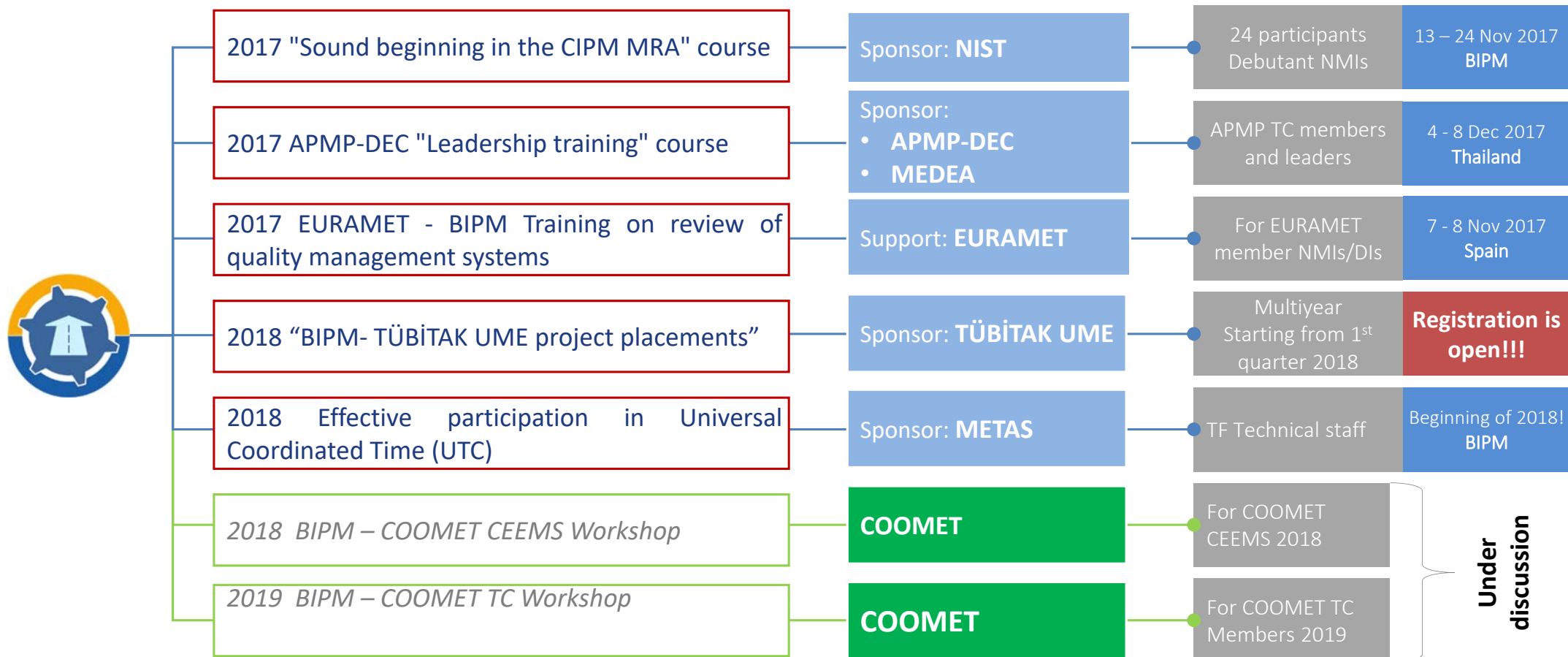
**Location:** BIPM, Sevres

[www.bipm.org](http://www.bipm.org)

### *Participants of the course*

| Title  | First Name              | Last Name          | Name of Institution | Country              | RMO          |
|--------|-------------------------|--------------------|---------------------|----------------------|--------------|
| Dr     | Mohammed                | Helmy Abd El-Raouf | NIS                 | Egypt                | AFRIMETS - 8 |
| Dr     | MURIIRA GEOFFREY        | KARAU              | KEBS                | Kenya                |              |
| Mr     | Leevi                   | Sakeus             | NSI                 | Namibia              |              |
| Mr     | LASSAAD                 | ABENE              | DEFNAT              | Tunisia              |              |
| Mr     | PRINCE NANA YAW         | TAWIAH             | GSA                 | Ghana                |              |
| Mr     | Victor Likando          | Mwazi              | ZABS                | Zambia               |              |
| Mr     | Blessing                | Chibaya            | NMI-SIRDC           | Zimbabwe             |              |
| Dr     | Seifelnasr              | Osman              | NIS                 | Egypt                |              |
| Mr     | Mulugeta                | DEREBEW            | NMIE                | Ethiopia             | APMP - 3     |
| Mr     | Md. Masud               | Al-Mamun           | NML-BSTI            | Bangladesh           |              |
| Mr     | DAMBASUREN              | Davaa              | MASM                | Mongolia             |              |
| Mr     | Salgaduge Dinesh Indika | Dias               | MUSSD               | Sri Lanka            | COOMET - 3   |
| Mr     | ELCHIN                  | BABAYEV            | AZSTAND             | Azerbaijan           |              |
| Mr     | Anatolii                | Bescupschii        | NMI (MD)            | Moldova              |              |
| Mr     | BAHLUL                  | SALMANOV           | AZSTAND             | Azerbaijan           | GULFMET 2    |
| Mr     | Ahmed                   | Albreiki           | EMI                 | United Arab Emirates |              |
| Mr     | Majed                   | Alsenaidi          | EMI                 | United Arab Emirates |              |
| Mr     | Olman                   | RAMOS              | LACOMET             | Costa Rica           | SIM - 7      |
| Mr     | César                   | Siguenza Jiménez   | INEN                | Ecuador              |              |
| Mr     | Edison                  | Condor             | INEN                | Ecuador              |              |
| Mr     | ROBERT                  | MEDFORD            | GDBS                | Grenada              |              |
| Mr     | Richard                 | Lawrence           | BSJ                 | Jamaica              |              |
| Mrs/Ms | María Lourdes           | Valenzuela Aldana  | INTN                | Paraguay             |              |
| Mr     | FRANCIS                 | HAMILTON           | TTBS                | Trinidad and Tobago  |              |

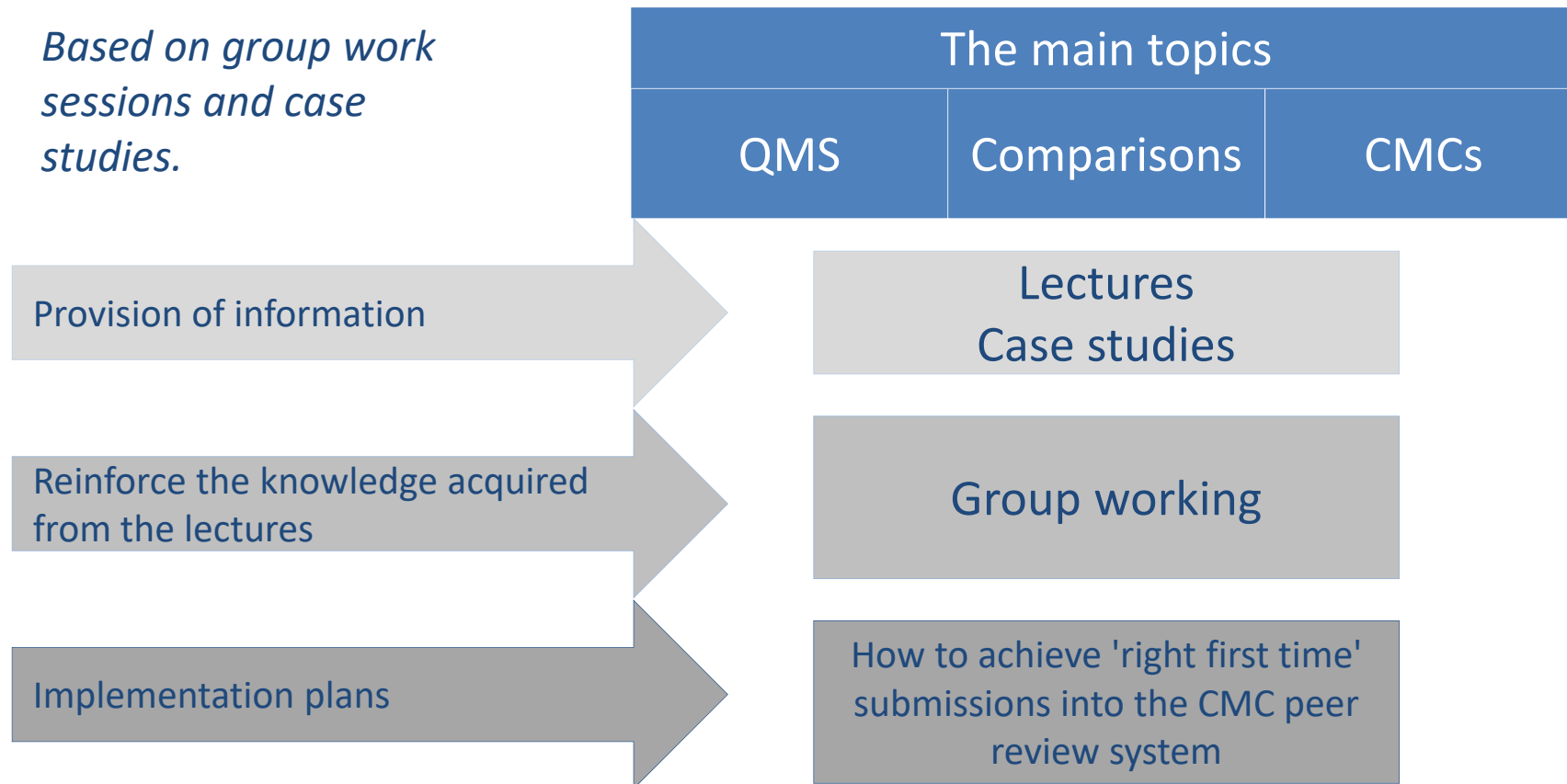
# FUTURE INITIATIVES





# The course Syllabus

*Based on group work sessions and case studies.*



# FUTURE INITIATIVES: 2017 APMP-DEC "Leadership training" course

## The project

- ✓ Designed to provide new or future leaders of APMP-DEC NMIs who have shown potential for leadership, with the skills, knowledge and tools to help them participate in the mechanisms of the CIPM MRA.

### Programme highlights:

- Global quality infrastructure and role of metrology
- The Metre Convention and the BIPM
- CIPM MRA: mechanisms, outcomes and benefits
- APMP structure, functions and capacity building
- Roles of DIs within the CIPM MRA: APMP perspective
- Roles and responsibilities in the comparison/CMC process
- CMC review process: interregional and intraregional
- Guidance on review of CMC files
- Getting the most from the KCDB, KCDB search engines and accessing KCDB statistics for analysis
- Strategic plan and focus group
- Results-based management and case studies

Covered by  
the BIPM



### Course dates and venue:

4-8 December 2017, at NIMT, Thailand.

### Support/Sponsor:

APMP-DEC and MEDEA

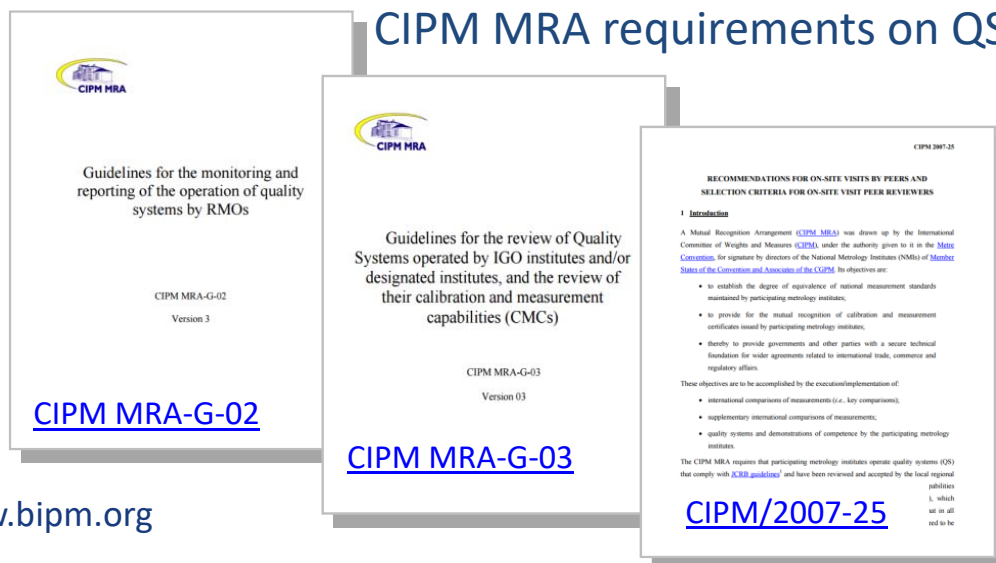
# FUTURE INITIATIVES: EURAMET - BIPM Training on review of quality management systems

## The project

- ✓ Focused on the processes related to evaluation of quality systems and peer-review of the NMI/DI technical capabilities within the framework of the CIPM MRA.
- ✓ Tailored to improve the competence of the quality managers and staff of the NMI/DI involved in reviewing quality management systems.
- ✓ Will enable participants to gain a deeper understanding of the CIPM MRA requirements and the EURAMET approach in quality system review, specific processes and expectations.



## CIPM MRA requirements on QS



**Training dates and venue:**  
7 - 8 November 2017, at INTA, Madrid (Spain)

**Support/Sponsor:**  
EURAMET

## FUTURE INITIATIVES: 2018 “BIPM- TÜBİTAK UME project placements”

### *The project*

- ✓ *TÜBİTAK UME laboratory-based training aims to equip **young and inexperienced metrologists with valuable technical skills** whilst pursuing a specific project of interest.*
- ✓ *The training programme will be designed individually for each participant, taking into account participant's research area and the laboratory capabilities at TÜBİTAK UME.*
- ✓ *Placements can range from 1 to 3 months and will be hosted at TÜBİTAK UME's laboratories.*
- ✓ *The training is scheduled to take place in two cycles during **2018 and 2019**, with the first cycle starting in April 2018.*

**Registration is now open!**



### **Training dates and venue:**

From 1 to 3 month 2018-2019.

Starts in April 2018, at **TÜBİTAK UME**

*Sponsor: TÜBİTAK UME, Turkey*

- *Laboratory and the selected candidates' accommodation costs.*

# Growing interest

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## **COOMET: Resolution 19/2017**

*.... to organize the training seminar in 2018 within the BIPM Capacity Building & Knowledge Transfer Programme (CBKT) for the economies with developing metrological infrastructure.*

*...to organize the training seminar in 2019 within the BIPM Capacity Building & Knowledge Transfer Programme (CBKT) for the Chairpersons of TC 1.1-1.12, 3.1 due to the expecting revision of the CIPM MRA Agreement.*

## **AFRIMETS: Resolution 6/2017**

*AFRIMETS GA notices with appreciation the participation of AFRIMETS delegates in the BIPM Capacity Building and Knowledge Transfer Programme, acknowledges the benefit to AFRIMETS and encourages the BIPM to continue with this excellent initiative.*

# Your support

- ✓ The BIPM CB&KT programme is based on the sponsor supported concept.
- ✓ The CB&KT Programme is flexible and consequently the BIPM welcomes offers of support for any type of initiative that helps achieve the aims of the programme.
- ✓ Sponsors that are interested in supporting may review the ongoing initiatives and a 'Menu' of activities .
- ✓ Sponsors may approach the BIPM to propose new initiatives.
- ✓ Sponsorship can be in many forms, such as financial or in-kind support.
- ✓ More information can be found on the BIPM dedicated CB&KT website at: <http://www.bipm.org/en/cbkt/> or by contacting the CB&KT team email at: [cbkt@bipm.org](mailto:cbkt@bipm.org).





中国计量科学研究院  
National Institute of Metrology, China

The BIPM thanks...



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The Government of the Hong Kong Special Administrative Region



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